

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board

Paper No. 36

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TAKANOBU KAMAKURA

Appeal No. 1999-1627
Application 08/578,980

Heard: January 23, 2002

Before JERRY SMITH, LALL and BLANKENSHIP, Administrative Patent Judges.

LALL, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 1-10, all the pending claims in the application.

The disclosed invention relates to a dense defect layer having a defect density, a value of a lattice constant, and a thickness which are designed to protect a hetero-configuration from remote crystal defect migration. This layer is provided in

a portion of a semiconductor light emitting device separated from the hetero-configuration having an active light emitting layer sandwiched between two clad layers so as to protect all of the layers of the hetero-configuration from secondary generated crystal defects. Accordingly, the dense defect layer advantageously safeguards all of the hetero-configuration layers from secondary crystal defects migrating or extending to these hetero-configuration layers after, for instance, heat processing associated with resin packaging of the semiconductor light emitting device induces crystal defects in surface regions and other regions external to the hetero-configuration layers. A further understanding of the invention can be obtained from reading the following claim.

Claim 1 is reproduced below:

1. A semiconductor light emitting device comprising:

a hetero-configuration having an active layer that emits light when charge carriers are injected, a first clad layer, and a second clad layer, the active layer being interposed between the clad layers, the first and second clad layers each having an approximately equal layer thickness acting to keep the injected charge carriers in the active layer;

a first and a second electrode, the layers of the hetero-configuration being interposed between the electrodes; and

a first dense defect layer provided between the first electrode and the layers of the hetero-configuration, the first dense defect layer being made of a material having a

Appeal No. 1999-1627
Application 08/578,980

concentration of crystal defects, a value of a lattice constant, and a thickness which together prevent at least some of the crystal defects generated remotely from the layers of the hetero-configuration from reaching the layers of the hetero-configuration.

The examiner relies on the following references:

Scifres et al. (Scifres)	4,984,242	Jan. 8, 1991
Inoue et al. (Inoue)	5,019,874	May 28, 1991
Sugawara et al. (Sugawara)	5,153,889	Oct. 6, 1992

Claims 1, 3 and 5 stand rejected under 35 U.S.C. § 102 as being anticipated by Scifres.

Claims 2 and 8 stand rejected under 35 U.S.C. § 103 as being unpatentable over Scifres in view of Inoue.

Claims 4 and 6 stand rejected under 35 U.S.C. § 103 as unpatentable over Scifres in view of Sugawara.

Claims 5, 7, 9 and 10 stand rejected under 35 U.S.C. § 103 as being unpatentable over Scifres in view of Sugawara and Inoue.

Rather than repeat the arguments of Appellant and the Examiner, we make reference to the briefs¹ and the answer for the respective details thereof.

¹ A reply brief was filed as Paper No. 23 on May 4, 1999. The Examiner noted the entry of the reply brief on Feb. 12, 2001. See Paper No. 28.

OPINION

We have considered the rejections advanced by the Examiner and the supporting arguments. We have, likewise, reviewed the Appellant's argument set forth in the briefs.

We affirm.

Rejections under 35 U.S.C. § 102

In response to the anticipation rejection of claims 1, 3 and 5 (answer at page 3), Appellant argues (brief at page 6), that "strain layer 27 [in Scifres] could not function to protect the portion of cladding layer 25 between it and 23, for example, from being impacted by defect migration." To embellish the position of the Examiner stated at pages 8 and 9 of the Examiner's answer, i.e., that the strain layer 27 of Scifres does indeed protect the hetero-configuration from the dense defects migrating from the external environment to the device, we note that the claims do not preclude reading layers 31, 29 and 25 [portion of 25 between 27 and 29] as the hetero-configuration light emitting device. Furthermore, we also note that claim 1 only requires that the arrangement "prevent at least some of the crystal defects generated remotely from the layers of the hetero-configuration [our emphasis]." Therefore, even assuming that layer 25 is divided by strain layer 27 in Scifres, still the

arrangement shown in Figure 2 of Scifres prevents the hetero-configuration from at least some of the crystal defects as claimed. Therefore, without reaching the issue raised by the examiner (answer at page 9) that a strain layer must be formed in the form of a sandwich between two halves of clad layer 25 for proper construction, we are of the opinion that, as claimed, Figure 2 of Scifres anticipates the limitations of claim 1.

With respect to claim 5, Appellant argues, brief at page 12, that "the material or function of such a graded buffer layer [Scifres at column 3, lines 36-38] are not taught and it is pure conjecture to assume [that] such a 'graded buffer layer' will automatically have the capability of meeting then [sic] claim 5 function noted above." We are unpersuaded by Appellant's argument. We find that the buffer layer pointed out by the Examiner at column 3, lines 36-38 of Scifres does indeed serve the function of a buffer. Furthermore, Figure 1 of the Appellant's disclosure which is labeled as prior art also shows layer 11 as a buffer just like the buffer shown in Figure 2 of Appellant's disclosure as a part of the invention. Therefore, we sustain the anticipation rejection of claim 5 based on Scifres. Since claim 3 falls with claim 1, we also sustain the anticipation rejection of claim 3 based on Scifres.

Rejections under 35 U.S.C. § 103

Various combinations of references are used to reject various claims.

Scifres and Inoue

The Examiner rejects claims 2 and 8 under this combination at page 4 of the Examiner's answer. With respect to claim 2, Appellant argues, brief at page 14, that "In any event, it is unclear where the alleged benefit at the top of page 3 of the final rejection ('supplement the buffer region') is taught by Inoue and this rejection thus fails the burden placed on the PTO" Further Appellant argues, id., that "the Inoue teachings relate to creating canceling dislocations in order to correct the problem as discussed above This use of multiple defect regions to limit defect migration by cancellation is entirely different than the attempted blocking of defects with the induced strain layer of Scifres." We disagree with Appellant's position. First of all, Scifres itself discloses that a second dense defect layer may be added to prevent the hetero-configuration of Scifres from defect migration, (see column 4, lines 56 through 64). Therefore, the teaching of Inoue for the addition of a second dense defect layer in Scifres is merely cumulative. Furthermore, we disagree with Appellant that

Inoue only teaches the canceling of dislocations. We find that Inoue teaches to protect the hetero-configuration from defect migration either by cancellation, or by preventing or minimizing dislocations (see column 5, lines 10-32 and 53-65 of Inoue). We conclude that Inoue indeed is directed to the same problem as Appellant i.e., the problem of preventing defects from reaching the hetero-configuration device. Therefore, we find the combination of Scifres and Inoue proper and it meets claims 2.

With respect to claim 8, Appellant again argues the same point that the Inoue reference is directed to obtaining opposite effects compared with the results disclosed by Appellant. For the same rationale as above we disagree with Appellant and find that the combination of Scifres and Inoue is proper. Therefore, we sustain the obviousness rejection of claims 2 and 8 over Scifres and Inoue.

Scifres and Sugawara

The Examiner rejects claims 4 and 6 under this combination at pages 4 and 5 of the Examiner's answer. Appellant argues against the combination of Sugawara and Scifres at pages 15 and 16 of the appeal brief. We note here that Appellant's disclosure at Figure 1 which is labeled as prior art does indeed show layer 17 as the diffusion layer and is the same layer in Figure 2 of

the first embodiment of the invention. Moreover, same Figure 1 of the disclosure shows various other layers such as reflective layers 13. Therefore, the claimed diffusion layer is shown by the prior art. Moreover, Sugawara is related to the semiconductor light emitting device as is the device of Appellant. The current diffusion layer 15 is formed on the upper surface of the double hetero structure portion, under the first electrode (see column 6, lines 39 to 60 of Sugawara). Therefore, we find that the combination of Scifres and Sugawara is proper and meets the claimed limitations. Consequently, we sustain the obviousness rejection of claims 4 and 6 over Scifres and Sugawara.

Scifres, Sugawara and Inoue

The Examiner rejects claims 5, 7, 9 and 10 under this combination at pages 5 and 6 of the Examiner's answer. However, we note that Appellant, page 16 of the brief, merely makes a reference to the arguments made above regarding these claims, and offers no further arguments specifically directed to these claims. Since we have dealt with these arguments before, we sustain the obviousness rejection of claims 5, 7, 9 and 10 over Scifres, Sugawara and Inoue.

Appeal No. 1999-1627
Application 08/578,980

In conclusion, we have sustained the anticipation rejection of claims 1, 3, and 5 by Scifres; obviousness rejection of claims 2 and 8 over Scifres and Inoue; obviousness rejection of claims 4 and 6 over Scifres and Sugawara; and obviousness rejection of claims 5, 7, 9 and 10 over Scifres, Sugawara and Inoue.

The decision of the Examiner rejecting claims 1-10 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

Jerry Smith
JERRY SMITH

JERRY SMITH
Administrative Patent Judge

Parshotam Hall.

PARSHOTAM S. LALL
Administrative Patent Judge

Howard B. Klenz

HOWARD B. BLANKENSHIP
Administrative Patent Judge

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Appeal No. 1999-1627
Application 08/578,980

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